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RESULTS OF DIRECT SEEDING PONDEROSA PINE

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The practicability of direct seeding ponderosa pine has been tested by the Northern Rocky Mountain Forest and Range Experiment Station in five places during the past nine years. Two tests were located on western white pine sites in northern Idaho and three tests on ponderosa pine sites in northern Idaho and western Montana. Early results, details of methods, and descriptions of areas have been reported by McKeever (1) and Schopmeyer (2,3).

The importance of protecting ponderosa pine seed spots from seed-eating rodents was clearly shown by two tests in the white pine type on Kalispell Creek, Kaniksu National Forest. Protection from rodents was accomplished through the use of conical wire screens placed over the seed spots. Higher initial stocking of ponderosa pine resulted from fall sowing than from spring sowing. Cultivation of the soil in the seed spots prior to sowing had no significant effect on germination and early stocking.

SEEDLING ESTABLISHMENT

Kalispell Creek

Fifth-year stocking at Kalispell Creek on spots screened for one year following sowing was exceptionally high (table 1), while on unprotected spots stocking was unsatisfactory.

Ellis Creek

On a fall-sown plot in the ponderosa pine type on Ellis Creek, Lolo National Forest, all seed spots were protected with wire screens from the time of seed sowing until germination was

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Table 1 -- Stocking of ponderosa pine on fall-sown seed spots

Location of area	Description of area	Year sown	Special protection	Stocked spots at 5 years	Seedlings per stocked spot at 5 years
				Percent	Number
Kalispell Creek, Kaniksu National Forest	Flat bench, clear-cut and broadcast burned 1937. (Two separate plot locations about 1 mile apart. Results were almost identical.)	1937	Screened for one year after sowing	99	12.6
			None	20	1.4
Ellis Creek, Lolo National Forest	North slope, 20-30 year old logging, burned since logging, rocky soil, sparse cover of vegetation.	1939	Screened for one year after sowing	53 1/	4.4 1/
			Screened over winter only	1 1/	3.0 1/
Ninemile Creek, Lolo National Forest	South slope, old logging area, rocky soil. Moderately-dense cover of shrubs and grass	1940	Screened for one year after sowing	45	2.2
			Screened over winter only	40	2.1
Bimerick Creek, Nezperce National Forest	All aspects, severely burned in 1934. Moderately-dense cover of snowbrush ceanothus, willow, and Douglas maple	1940	Screens plus pre-poisoning and poisoned seed	41	5.2
			Pre-poisoned and poisoned seed	3	2.2

1/ Stocking at 6 years. No 5-year count made.

completed. Screens were removed from alternate spots at the time of the germination count. Examination one month later revealed that unidentified organisms, possibly mice or grasshoppers, had clipped every seedling in all but one percent of the spots from which the screens were removed. Sixth-year stocking on the spots where screens were left in place until the end of the first growing season was 53 percent, with an average of 4 seedlings per stocked spot. Terminal shoots on one or more seedlings on 20 percent of the seed spots were observed to have been clipped recently at the time of the sixth-year examination. The recent damage probably was caused by rodents. Growth has been retarded and some mortality has resulted from such injuries. Plant competition has not been a serious factor on this area.

Ninemile Creek

A fall-sown plot in the ponderosa pine type in Ninemile Creek, Lolo National Forest, suffered comparatively little clipping injury although the same in layout as the Ellis Creek plot. Stocking at five years was 45 percent on the spots screened during the first growing season and 40 percent on the spots unscreened after completion of germination. The average number of seedlings per stocked spot was two in both cases. Recent seedling losses due to smothering by grass and fallen leaves were observed. The seedlings are still in an unfavorable competitive position with respect to grass and other vegetation. The preparation of larger seed spots, two or three feet in diameter, might have lessened competition for a longer time.

Bimerick Creek

Reducing the rodent population through the use of poisons was tested on Bimerick Creek, Nezperce National Forest, in an area supporting a moderate cover of shrubs. Thallium sulphate-coated sunflower seeds were scattered over the 50-acre seeding area about one week before sowing. Seed spots were sown with seed coated with a poisonous mixture containing strychnine. Further protection on one-half of the seed spots on sample plots within the seeding area was provided by wire screens for one year after seed sowing. The poisoning method tested on the Bimerick Creek plots was fairly successful for protecting the seed, but not quite as effective as screening. Seedlings germinated on 75 percent of the unscreened plots compared with 93 percent on the screened plots. However, mortality caused by nipping or cutting, drought, and smothering by leaves was severe on the unscreened spots. Almost half of this mortality was caused by grasshoppers during the first growing season. Stocking after five growing seasons was 41 percent on spots screened the first year, but only 3 percent on unscreened spots.

GROWTH

Growth of seedlings on seed spots has not equalled that of nursery-grown trees. Seed spot dominants averaged 7 feet in height on the Kalispell Creek plots after 9 growing seasons in contrast to 11 feet in adjoining plantations established at the same time. No plantations of similar age were available for comparison of height growth for the Ninemile, Ellis, and Bimerick Creek tests but observations elsewhere give reason to believe that planted trees would have made considerably better height growth.

Height growth on the characteristically dry ponderosa pine sites at Ninemile, Ellis, and Bimerick Creeks has been much slower than on the white pine sites in Kalispell Creek. The average height of dominant seedlings on the Ninemile plots was 5 inches at 5 years, and on Ellis Creek 6½ inches at 6 years. The seedspot dominants on the Bimerick Creek plots averaged 7 inches on the screened plots and 3½ inches on the unscreened plots after 5 growing seasons. The retarding effect of the grasshopper defoliation during the first season in the unscreened spots is quite evident on the Bimerick Creek area.

CONCLUSIONS

These experiments show that adequate germination can be obtained if the seeds are protected by screens or poisoning. Protection during the first growing season also was found to be essential on some of the test areas. Stocking at 5 years equalled or exceeded that on comparable plantations of nursery-grown trees when given necessary protection, but growth has been slower on the seed spots.

References

1. McKeever, D. G. 1942.
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2. Schopmeyer, C. S. 1940.
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3. Schopmeyer, C. S. 1939.
   Direct seeding in the western white pine type. Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana. Applied Forestry Notes No. 90.